

WHAT IS CLAIMED IS:

1. A biomaterial comprising:
a collagen-based biological tissue from a mammal; and
a plurality of cross-linking bonds between the tissue and one or more polyepoxy compounds.
2. The biomaterial of Claim 1, wherein the biomaterial is substantially decelluralized.
3. The biomaterial of Claim 1, wherein the biomaterial is substantially free from cells of the mammal.
4. The biomaterial of Claim 1, wherein the biomaterial is substantially free from debris of cells of the mammal.
5. The biomaterial of Claim 1, wherein a surface of the biomaterial is coated with a cryoprotective material.
6. The biomaterial of Claim 1, wherein the biomaterial is in a freeze-dried form.
7. The biomaterial of Claim 1, wherein the collagen-based biological tissue is from fascia; amnion, placenta or skin of a mammal.
8. The biomaterial of Claim 1, wherein the one or more polyepoxy compounds comprise a backbone of 17-25 carbon atoms and 4-5 epoxy groups.
9. The biomaterial of Claim 1, wherein the one or more polyepoxy compounds are selected from the group consisting of polyglycerol polyglycidyl ether, polyethylene glycol glycidyl ether and a mixture of the foregoing.
10. The biomaterial of Claim 1, wherein the tissue comprises a helical structure of polypeptides.
11. The biomaterial of Claim 1, wherein the plurality of cross-linking bonds are between the one or more polyepoxy compounds and one or more amino acids of the tissue.
12. The biomaterial of Claim 1, wherein the biomaterial is in the form of powder.
13. The biomaterial of Claim 1, wherein the collagen-based biological tissue comprises a bovine placental tissue or porcine skin tissue.
14. A method of using a biomaterial, the method comprising:
providing the biomaterial of Claim 1; and

applying the biomaterial to a human or animal body part in need thereof.

15. The method of Claim 14, wherein the biomaterial is in a powder form.
16. The method of Claim 15, wherein the powder has a size from about 100 μm to about 500 μm .
17. The method of Claim 15, wherein the application of the biomaterial comprises injecting into the body part a mixture comprising the powder in a liquid.
18. The method of Claim 17, wherein the powder in the mixture has a concentration of from about 400 mg/ml to about 500 mg/ml.
19. The method of Claim 17, wherein the liquid is PBS.
20. A method of providing a biomaterial, comprising:
providing a collagen-based biological tissue from a mammal; and
cross-linking the tissue using one or more polyepoxy compounds.
21. The method of Claim 20, further comprising removing cells from the tissue.
22. The method of Claim 20, further comprising destroying cells from the tissue.
23. The method of Claim 22, further comprising removing debris of the destroyed cells from the tissue.
24. The method of Claim 20, further comprising freeze-drying the tissue after the removal of cells.
25. The method of Claim 24, further comprising pulverizing the freeze-dried tissue.
26. The method of Claim 25, wherein the pulverization is conducted in a pulverizer under an environment of liquid nitrogen.
27. The method of Claim 24, further comprising hydrating the freeze-dried tissue.
28. The method of Claim 28, further comprising cutting the hydrated tissue.
29. The method of Claim 20, further comprising coating a cryoprotective material over the tissue after the removal of cells.
30. The method of Claim 29, wherein the cryoprotective material comprises hyaluronic acid.
31. The method of Claim 20, wherein the collagen-based biological tissue is fascia, amnion, placenta or skin of a mammal.

32. The method of Claim 20, wherein the one or more polyepoxy compounds comprise a backbone of 17-25 carbon atoms and 4-5 epoxy groups.

33. The method of Claim 20, wherein the one or more polyepoxy compounds are polyglycerol polyglycidyl ether, polyethylene glycol glycidyl ether or a mixture of the foregoing.

34. The method of Claim 20, wherein the tissue comprises a helical structure of polypeptides.

35. The method of Claim 20, wherein the polyepoxy compound reacts with one or more amino acid to form a cross-linking bondage.

36. The method of Claim 20, wherein the cross-linking comprises treating the biological tissue with 1-7%(w/v) of the one or more polyepoxy compounds.

37. The method of Claim 20, wherein the cross-linking comprises treating the biological tissue with the one or more polyepoxy compounds at a pH from about 8 to about 11.

38. The method of Claim 20, wherein the cross-linking comprises treating the biological tissue with the one or more polyepoxy compounds at a temperature from about 30 to about 45°C.

39. The method of Claim 20, wherein the cross-linking comprises treating the biological tissue with the one or more polyepoxy compounds for about 10 to 20 hours.

40. A biomaterial for tissue repair produced by the method of Claim 20.